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James E. Bradley Bracewell & Patterson, LLP P.O. Box 61389 Houston, TX 77208-1389			EXAMINER PIAZZA CORCORAN, GLADYS JOSEFINA	
			ART UNIT 1733	PAPER NUMBER

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/761,301	SCHMIDT, RONALD P.	
	Examiner	Art Unit	
	Gladys J Piazza Corcoran	1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/26/04, 1/02/04, 11/28/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13, 15-20, 22-24, 26-29, 32, 39, 43 and 45-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13, 15-20, 22-24, 26-29, 32, 39, 43 and 45-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 January 2004 is/are: a) ☒ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>See Continuation Sheet</u> . |

Continuation of Attachment(s) 6). Other: see Office Action for Drawing explanation .

DETAILED ACTION

Drawings

1. The proposed corrected drawing sheets 1, 3-7 received on January 2, 2004 are approved. A proper drawing correction or corrected drawings are required in reply to the Office Action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.
2. The proposed corrected drawing sheet 2 received on January 2, 2004 are not approved. The proposed correction to Figure 4 of the line for reference number 19 is pointing to the base 13 and not the base side of the pressure intensifier as described in the Specification.
3. It is additionally further noted that the dark lines underneath the bases in figure 1C filed May 1, 2001, also have to be removed in order to conform to the originally filed drawings and to overcome new matter rejections. Also, Figure 4 filed May 1, 2001 shows reference numbers 10 and 12 pointing to the same part, where the originally filed drawings and the specification disclose the reference number 10 as representing an assembly of parts including 12, 14, and 16 (page 8); and the figure should include reference number 13 as shown in the proposed drawing correction filed June 24, 2003 and previously approved (It is noted that these changes were corrected in the proposed Drawing correction filed January 2, 2003, however this sheet was not approved in regard to reference number 19 as discussed above).

Specification

4. The amendments filed January 26, 2004 and June 24, 2003 are objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The Specification now recites, "A plane 25 that is normal to exterior side 23 equally bisects the corner formed by leg side 21 and base side 19. When positioned adjacent pre-form 14 prior to curing, the plane that is normal to exterior side 23 also equally bisects a corner formed by base 13 or base 19 and one of the legs 15. In the embodiment of Figure 4, base side 19 and leg side 21 are 90° relative to each other and of equal lengths." There is no support in the original specification, including the original drawings that describe or show the "plane 25" normal to the exterior side and bisecting the corner (of the perform or of the pressure intensifier). There is also no support in the original specification, including the original drawings that describe or show that the base side and the leg side are of equal lengths. It is noted that there is no indication that the originally submitted drawings are working drawings.

Applicant is required to cancel the new matter in the reply to this Office Action.

5. The disclosure is objected to because of the following informalities: Line 11 of the newly amended paragraph of the Specification on page 9 recites, "equally bisects a corner formed by base 13 or base 19 and one of the legs 15". This amendment is unclear in that there is no base 19, only a base side 19 and the base side 19 does not form a corner with either of the legs 15.

Appropriate correction is required.

Claim Objections

6. Claims 26, 29, 32 are objected to because of the following informalities:

Claim 26 recites in line 6, "said legs," which should be --said legs.--

Claim 29 recites in line 2, "said pre-form" which should be --said pre-form.--

Claim 32 recites in line 4, "wherein." which should be --wherein--

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 17, 23, 24, 26-29, 32, 39, 43, 46, 48 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 17 recites that "said base side and said leg side of each of said pressure intensifiers are equal in length" and claim 32 recites that "said base side and said leg side of each of said pressure intensifiers are of the same length." There is no support or suggestion in the original specification that the sides of the pressure intensifiers are equal in length. It is noted that there is no indication that the originally filed drawings are working drawings.

Claims 23 and 26 recite, "a plane normal to said exterior side of each of said pressure intensifiers passes through a corner formed by a junction of said base with one of said legs." There is no support in the original specification for such a line. It is also unclear what this limitation further adds to the claim language and it appears to have no relationship with the invention.

Claim 24 recites, "affixing an additional adhesive film between one side of a second pre-cured laminated composite structure and an inner surface of one of the legs of said 3-D woven textile pre-form, and inserting an additional adhesive film between an opposite side of said second pre-cured laminated composite structure and an inner surface of the other of said legs." Claim 46 recites, "with additionally adhesive **films** between inside surfaces of the legs and the second structure". While the specification discloses providing an adhesive film in the slot of the pre-form, between the pre-form and a second pre-cured laminated composite structure, there appears to be no support for inserting an additional adhesive film or adhesive **films** between the pre-form and the second pre-cured laminated composite structure.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 23 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

11. Claims 23 and 26 recite, "a plane normal to said exterior side of each of said pressure intensifiers passes through a corner formed by a junction of said base with one

of said legs." There is no support in the original specification for such a line. It is also unclear what this limitation further adds to the claim language and it appears to have no relationship with the invention.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 13, 15-18, 22-24, 26, 27, 32, 43, 46-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. (DE 19832441 C1 with English equivalent US Patent No. 6,306,239) in view of Abildskov (US Patent No. 4,782,864) and Hertzberg (US Patent No. 4,96,802) as further taken with Sloman (WO 98/50214).

Breuer discloses a method of forming a structural assembly by affixing a first pre-cured assembly (skin member 6) to a 3-D textile pre-form (stiffening profile members 7) impregnated with an uncured resin (column 4, lines 52-60; column 6, lines 9-26), affixing a second pre-cured assembly (stringer core blanks 5) (between the legs) to said 3-D textile pre-form (stiffening profile members 7) (column 5, lines 23-40) and curing the resin to form the structural assembly (column 7, lines 30-55).

As to the limitation that the 3-D perform is woven, Breuer does disclose that pre-form is a fiber reinforced composite material of fiber textile materials (column 6, lines 18-26), however Breuer does not specifically disclose that the pre-form is woven.

Abildskov discloses that an improvement of prior art methods with a pair of fabric

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connectors is to provide one three dimensional woven fabric connector in order to avoid peel problems of the prior art methods (figures 1, 3; column 2, lines 35-68). As to the newly added limitations that the perform has a base and two legs extending from the base with the first pre-cured assembly on a side of the perform opposite the legs, the 3-D woven textile pre-form in Abildskov has an additional leg extending from the base, the pre-form is Pi-shaped, and as to claim 24, the legs are at a 90 degree angle (see figure 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming a structural assembly as shown by Breuer by providing a 3-D woven textile pre-form in a Pi shape in order to overcome peel problems associated with using two fabric pieces (stringer core blanks 5) as shown by Abildskov.

As to the limitations of an adhesive film being located between the first pre-cured assembly and the pre-form, an additional adhesive film being located between the second pre-cured assembly and the pre-form, and curing the adhesive films to form the structural assembly, Breuer only discloses curing the resin in the 3-D pre-form to provide the bonding between the pre-form and the two pre-cured assemblies. Hertzberg discloses it is known in the art to provide an adhesive film between parts of structural assemblies in order to prevent delamination and provide a stronger bond than the prior art methods of only utilizing the resin in the parts for bonding when cured (column 1, lines 19-16; column 3, lines 25-31). Hertzberg further discloses that the adhesive film layers are placed between the joined surfaces of the parts of the structural assembly and then the structural assembly is cured (column 2, lines 55-68; column 4,

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line 47 to column 5, line 8; column 9, line 41). It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming a structural assembly as shown by Breuer and Abildskov by providing adhesive film layers between the interfaces of 3-D pre-form and the pre-cured assemblies in order to reduce delamination and provide a stronger bond as shown by Hertzberg.

As to the limitations of providing first and second pressure intensifiers of flexible material against exterior surfaces of the legs and base for pressing the base and legs of the pre-forms against portions of the pre-cured assemblies with the evacuation of the vacuum bag, it is well known in the art to provide such pressure intensifiers for properly applying pressure against corners of composite materials during curing. For example, Sloman discloses that it is known in the production of composite components to use a pressure transmitter to allow pressure to be applied to the composite components during their molding in a tool and for molding techniques that involve the use of a vacuum bag applied to the molding (pages 1, 3). In particular, pressure transmitters are used for the female features on the non-molded side of the component (page 1). A flexible (elastomeric) pressure intensifier for a corner concave region is arranged on the composite corner with a base side on the base and a leg side on the leg and an exterior side that extends from an edge of the base side to the edge of the leg side (page 6; figure 2). The vacuum bag (19) is placed over the composite and the pressure intensifier to press the sides of the composite. As to claim 24, the pressure intensifiers are triangular in cross section (see figure 2). As to claim 46, the pressure intensifier in Sloman is a three sided polygon in cross section with two straight inner sides

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intersecting each other defining a corner portion and an exterior side that extends between edges of the inner sides (see figure 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of forming a structural assembly as shown by Breuer, Abildskov, and Hertzberg, with pressure intensifiers on each of the two corner portions of the pre-form (thus using two pressure intensifiers) in order to provide proper pressure and molding to the corner structure of the composite during vacuum molding as is well known and exemplified by Sloman.

As to the limitations of inserting the parts into the vacuum bag, Breuer discloses the step of curing is implemented by inserting the pre-cured assemblies and the pre-form into a vacuum bag and evacuating and heating the vacuum bag (column 7, lines 30-60). Clearly the adhesive films between the parts and the pressure intensifiers would also be inserted in the vacuum bag.

As to claim 15, Breuer discloses the pre-cured assemblies are pre-cured laminated composite structures (column 4, lines 51-60; column 5, lines 23-40). As to claim 16, Breuer discloses curing the structural assembly with heat and pressure (column 7, lines 30-55). As to claims 17 and 32, the pressure intensifier shown in Sloman (figure 2) appears to have a base side and a leg side with equal lengths. Furthermore, it would have been well within the purview of one of ordinary skill in the art to provide the sides with equal lengths, only the expected results would be attained. As to claim 18, the exterior side of the pressure intensifier in Sloman is concave (figure 2). As to claims 22 and 43, the material in Sloman for the pressure intensifier is an elastomeric material (rubber) (page 4). As to claims 23 and 26, a plane that is normal to

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the exterior side of the pressure intensifier in Sloman passes through a corner formed by a junction of the base with one of the legs (see figure 2). As to claim 24, the adhesive film layers would be between all the surfaces of the pre-form and the pre-cured assemblies and therefore would be between the base of the pre-form and the pre-cured assembly and between the leg of the perform and the pre-cured assembly. As to claim 27, Breuer discloses the curing is implemented by heating the vacuum bag (column 7, lines 30-55). As to claims 47 and 48, the pressure intensifier shown in Sloman has a base side and a leg side at a right angle to each other, is triangular in cross section, and a concave exterior side.

14. Claims 19, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg and Sloman as applied to claims 13 and 24 above, and further in view of Leaversuch (Electron-Beam Treatment Upgrades a Range of High-Volume Materials) and/or Bersuch et al. (Affordable Composite Structure for Next Generation Fighters).

Breuer discloses curing the structural assembly with heat and pressure (column 7, lines 30-55). Leaversuch discloses E-beam treatment for curing polymers (for example epoxy) reduces speed cycles, tooling, manufacture and energy costs, and provides increased dimensional stability in a variety of areas including advanced composites for aerospace and transportation parts. Bersuch also discloses E-beam treatment curing as a known method for curing structural assemblies (pages 1, 2, 8). It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming structural assemblies as shown by Breuer, Abildskov,

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Hertzberg and Sloman by curing the resin in the structural assemblies through and E-beam treatment as shown by Leaversuch to reduce costs and increase dimensional stability in advanced composites for aerospace and transportation parts particularly since it is well known that the resin used in structural assemblies such as the ones in Breuer, Abildskov and Hertzberg is epoxy (see for example Hertzberg, column 1, line 68) and/or as shown by Bersuch as an alternative to heat curing in structural assemblies.

15. Claims 20, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg, Sloman as applied to claims 13, 24 above, and further in view of Bersuch et al. (Affordable Composite Structure for Next Generation Fighters) and/or Sheahen et al. (Robust Composite Sandwich Structures).

It is well known to apply additional composite overwrap plies on pre-forms for structural assemblies for a stronger joint bond. For example, Bersuch (page 9) and/or Sheahen (pages 6-7) both disclose applying composite overwrap plies on an exterior surface of a woven pre-form. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of forming a structural assembly as shown by Breuer, Abildskov, Hertzberg, and Sloman by providing an overwrap ply over an exterior surface of the woven pre-form as shown by Bersuch and/or Sheahen in order to provide a stronger and more secure joint. One of ordinary skill in the art would understand providing the overwrap plies prior to cure (thus, prior to pressing the leg sides of the pressure intensifiers against the legs) in order to properly form the composite in the well known manner, only the expected results would be attained.

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16. Claims 39 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg and Sloman as applied to claims 24 and 13 above, and further in view of Mueller et al. (US Patent No. 6,173,925) and/or Morris et al. (US Patent No. 5,944,286).

It is known to provide tapered edges on a pre-form for structural assemblies in order to provide a more aesthetic transition, to provide a greater surface area for bonding, and for better transmission of loads on the structural assembly. For example, Mueller discloses an example of a pre-form (27) in a structural assembly with tapered edges (figure 1; column 3, line 64 to column 4, line 23; column 4, lines 53-60). Morris discloses another example of a pre-form (6, 7) in a structural assembly having tapered edges (see figure 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a method of forming a structural assembly as shown by Breuer, Abildskov, Hertzberg, and Sloman by providing the pre-form with a tapered edge as is well known in the art and exemplified by Mueller and/or Morris in order to provide a structural assembly with a more aesthetic transition, greater surface area for bonding, and better transmission of loads on the assembly. It is noted that Applicant has not asserted any criticality to the tapered edges.

17. Claims 24, 27, 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. (DE 19832441 C1 with English equivalent US Patent No. 6,306,239) in view of Abildskov (US Patent No. 4,782,864) and Hertzberg (US Patent No. 4,96,802) as further taken with Barnes et al. (US Patent No. 6,007,894).

Breuer discloses a method of forming a structural assembly by affixing a first pre-cured assembly (skin member 6) to a 3-D textile pre-form (stiffening profile members 7) impregnated with an uncured resin (column 4, lines 52-60; column 6, lines 9-26), affixing a second pre-cured assembly (stringer core blanks 5) (between the legs) to said 3-D textile pre-form (stiffening profile members 7) (column 5, lines 23-40) and curing the resin to form the structural assembly (column 7, lines 30-55).

As to the limitation that the 3-D perform is woven, Breuer does disclose that pre-form is a fiber reinforced composite material of fiber textile materials (column 6, lines 18-26), however Breuer does not specifically disclose that the pre-form is woven. Abildskov discloses that an improvement of prior art methods with a pair of fabric connectors is to provide one three dimensional woven fabric connector in order to avoid peel problems of the prior art methods (figures 1, 3; column 2, lines 35-68). As to the newly added limitations that the perform has a base and a pair of legs extending from the base at a 90 degree angle, the 3-D woven textile pre-form in Abildskov has an additional leg extending from the base, and the pre-form is Pi-shaped (see figure 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming a structural assembly as shown by Breuer by providing a 3-D woven textile pre-form in a Pi shape in order to overcome peel problems associated with using two fabric pieces (stringer core blanks 5) as shown by Abildskov.

As to the limitations of an adhesive film being located between the first pre-cured assembly and the pre-form, additional adhesive films being located between the second pre-cured assembly and the pre-form, and curing the adhesive films to form the

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structural assembly, Breuer only discloses curing the resin in the 3-D pre-form to provide the bonding between the pre-form and the two pre-cured assemblies. However, Hertzberg discloses it is known in the art to provide an adhesive film between parts of structural assemblies in order to prevent delamination and provide a stronger bond than the prior art methods of only utilizing the resin in the parts for bonding when cured (column 1, lines 19-16; column 3, lines 25-31). Hertzberg further discloses that the adhesive film layers are placed between the joined surfaces of the parts of the structural assembly and then the structural assembly is cured (column 2, lines 55-68; column 4, line 47 to column 5, line 8; column 9, line 41). It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming a structural assembly as shown by Breuer and Abildskov by providing adhesive film layers between the interfaces of 3-D pre-form and the pre-cured assemblies in order to reduce delamination and provide a stronger bond as shown by Hertzberg.

Breuer discloses the pre-form and the pre-cured assemblies are placed in a vacuum bag that is evacuated and heated for curing, where the evacuation causes pressure against having an exterior portion/surface of the pre-form not between the pre-cured assemblies to press the pre-form against the pre-cured assemblies (column 7, lines 30-55).

As to the limitations that a pair of flexible pressure intensifiers are provided, Barnes discloses a method of curing a structural member by where the pressure against the parts is facilitated by providing a pressure intensifiers (silicone rubber blocks 221) that are triangular in cross section (column 6, lines 12-19; column 8, lines 45 and 46)

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against a base and the exterior surface of the leg portions of the pre-form (body sheet 53), placing the pressure intensifiers (221), pre-form (53) and structural assembly parts (43, 83) in a vacuum bag and evacuating the bag in order to cause the pressure intensifier to press the pre-form against the other structural assembly parts (see figure 25; column 8, lines 30-35, column 9, lines 14-33). It would have been obvious to one of ordinary skill in the art at the time of the invention to form the structural assembly as shown by Breuer, Abildskov and Hertzberg by providing pressure intensifiers in the vacuum bag during curing in order to provide pressure against the assembly parts for proper bonding as shown by Barnes.

As to claim 27, Breuer discloses the curing is implemented by heating the vacuum bag (column 7, lines 30-55). As to claim 43, the pressure intensifiers in Barnes (silicone rubber blocks 221) are formed of rubber.

18. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg and Barnes as applied to claim 24 above, and further in view of Leaversuch (Electron-Beam Treatment Upgrades a Range of High-Volume Materials) and/or Bersuch et al. (Affordable Composite Structure for Next Generation Fighters).

Breuer discloses curing the structural assembly with heat and pressure (column 7, lines 30-55). Leaversuch discloses E-beam treatment for curing polymers (for example epoxy) reduces speed cycles, tooling, manufacture and energy costs, and provides increased dimensional stability in a variety of areas including advanced composites for aerospace and transportation parts. Bersuch also discloses E-beam

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treatment curing as a known method for curing structural assemblies (pages 1, 2, 8). It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming structural assemblies as shown by Breuer, Abildskov, Hertzberg and Barnes by curing the resin in the structural assemblies through and E-beam treatment as shown by Leaversuch to reduce costs and increase dimensional stability in advanced composites for aerospace and transportation parts particularly since it is well known that the resin used in structural assemblies such as the ones in Breuer, Abildskov and Hertzberg is epoxy (see for example Hertzberg, column 1, line 68) and/or as shown by Bersuch as an alternative to heat curing in structural assemblies.

19. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg, Barnes as applied to claim 24 above, and further in view of Bersuch et al. (Affordable Composite Structure for Next Generation Fighters) and/or Sheahen et al. (Robust Composite Sandwich Structures).

It is well known to apply additional composite overwrap plies on pre-forms for structural assemblies for a stronger joint bond. For example, Bersuch (page 9) and/or Sheahen (pages 6-7) both disclose applying composite overwrap plies on an exterior surface of a woven pre-form. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of forming a structural assembly as shown by Breuer, Abildskov, Hertzberg, and Barnes by providing an overwrap ply over an exterior surface of the woven pre-form as shown by Bersuch and/or Sheahen in order to provide a stronger and more secure joint. One of ordinary skill in the art would

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understand providing the overwrap plies prior to cure (thus, prior to pressing the leg sides of the pressure intensifiers against the legs) in order to properly form the composite in the well known manner, only the expected results would be attained.

20. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg and Barnes as applied to claim 24 above, and further in view of Mueller et al. (US Patent No. 6,173,925) and/or Morris et al. (US Patent No. 5,944,286).

It is known to provide tapered edges on a pre-form for structural assemblies in order to provide a more aesthetic transition, to provide a greater surface area for bonding, and for better transmission of loads on the structural assembly. For example, Mueller discloses an example of a pre-form (27) in a structural assembly with tapered edges (figure 1; column 3, line 64 to column 4, line 23; column 4, lines 53-60). Morris discloses another example of a pre-form (6, 7) in a structural assembly having tapered edges (see figure 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a method of forming a structural assembly as shown by Breuer, Abildskov, Hertzberg, and Barnes by providing the pre-form with a tapered edge as is well known in the art and exemplified by Mueller and/or Morris in order to provide a structural assembly with a more aesthetic transition, greater surface area for bonding, and better transmission of loads on the assembly. It is noted that Applicant has not asserted any criticality to the tapered edges.

Response to Arguments

21. Applicant's arguments filed November 10, 2003 have been fully considered but they are not persuasive.

Applicant argues on pages 10-11, and 12-13 that the amendment of a plane normal to the exterior side 23 that bisects a corner formed by the base and legs and the leg side and base side, is inherent in the drawings as originally filed. Examiner does not agree that the Applicant was in possession and adequately described the new amendments and maintains the rejections. Additionally these limitation do not appear to be relevant to any possible patentability of the claims. There is no indication that the original figures were working figures.

Applicant argues on page 11 that it is clear from Figure 4 that the base leg 19 and side leg 21 have equal lengths. As discussed in the previous Office Action there is no indication in the Drawings or the Specification that the legs are of equal lengths or that the drawings are working drawings.

Applicant argues on page 12 that Figure 4 shows an adhesive layer on the right side of the vertical part 12 and another adhesive layer on the left side of the vertical part 12 and that the adhesive may be two layers or one U-shaped layer. The originally filed Figure 4 drawing shows one adhesive layer in a U shape that is on the left and right sides of the vertical part 12. Additionally there is no support in the Specification of two separate adhesive layers, in fact the entire specification discloses an adhesive layer, not multiple layers. It is noted that Applicant refers to originally filed figure 9C for more clearly showing two separate adhesive layers. It appears that Applicant may be

referring to figure 9A and not 9C, however in either case, there is no clear indication in the original drawings or specification that Applicant had possession of providing two separate adhesive layers. In fact the Specification by reciting **an** adhesive layer throughout indicates that Applicant only had possession of a single adhesive layer.

Applicant argues on pages 13-20 that the references individually do not teach the claim limitations. However, as discussed in the previous office action, Breuer discloses forming a structural assembly with pre-cured parts (5 and 6) and an uncured pre-preg pre-form (7) where one of the pre-cured parts (5) is between "legs" of the preform (7), Abildskov discloses that it is advantageous to form structural assemblies with woven pie shapes as an improvement over two L-shaped pre-pregs, Hertzberg discloses it is known to provide adhesive layers between structural parts when curing in order to provide higher shear strength, and finally Sloman and/or Barnes show it is known to provide pressure intensifiers in order to provide proper pressure in corner areas of structural parts. Therefore all the claim limitations are met by the references as discussed in the prior Office Action.

It is noted that Applicant argues on pages 17-18 that the reference Sloman does not disclose a flexible or compliant pressure intensifier and that the pressure intensifier in Sloman is fairly rigid. The claim recites a first and second pressure intensifier of flexible material. Sloman does disclose a pressure intensifier of flexible material (elastomeric material). There is no difference between the claimed pressure intensifier and the pressure intensifier disclosed in Sloman. It is unclear how Applicant comes to the conclusion that the pressure intensifier in Sloman is fairly rigid and it is further

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unclear how one of ordinary skill in the art would be able to ascertain any difference between the relative flexibilities of the claimed invention and the pressure intensifier disclosed in Sloman.

Applicant argues on page 21 that Mueller shows adhesive strips that form a tapered structure but not woven pre-forms that taper in thickness and that Morris does not show a tapered pre-form. It is also noted that the claims do not exclude forming a tapered edge by layering as shown in Mueller. The claims merely require that the pre-form have tapered edges. As discussed above, it is known to provide tapered edges on a pre-form for structural assemblies in order to provide a more aesthetic transition, to provide a greater surface area for bonding, and for better transmission of loads on the structural assembly. Mueller discloses an example of a pre-form (27) in a structural assembly with tapered edges (figure 1; column 3, line 64 to column 4, line 23; column 4, lines 53-60). Morris also discloses an example of a pre-form (6, 7) in a structural assembly having tapered edges (see figure 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a pre-form with a tapered edge as is well known in the art and exemplified by Mueller and/or Morris in order to provide a structural assembly with a more aesthetic transition, greater surface area for bonding, and better transmission of loads on the assembly. Again, it is noted that Applicant has not asserted any criticality to the tapered edges.

Applicant further argues on page 22 that Barnes does not disclose the claimed invention individually. As discussed above and in the prior Office Action, the reference Barnes is cited to show it is known in the art to provide pressure intensifiers (in

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particular triangular shaped pressure intensifiers) when vacuum curing structural components together.

22. Applicant's arguments filed January 2, 2004 have been fully considered but they are not persuasive.

Applicant argues on page 9 that all the claims require that the pressure intensifier 18 (Figure 4) extend past the ends of the base section 13 and legs 15 of the pre-form. These limitations are not present in the latest version of the claims filed on January 26, 2004.

Applicant argues on page 10 that the limitation of tapered end sections in claims 15 and 24 are not shown by the references. See the discussion of Mueller and Morris above, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide tapered ends to the pre-forms as shown by the references in order to provide a structural assembly with a more aesthetic transition, greater surface area for bonding, and better transmission of loads on the assembly as exemplified by Mueller and Morris, only the expected results would be attained.

Applicant further argues on page 10 that the limitations in claims 15 and 24 further include the pressure intensifiers having straight sides in a single plane that are spaced from the tapered sections initially. Again, these limitations are not present in the latest version of the claims filed on January 26, 2004.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gladys J Piazza Corcoran whose telephone number is

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(571) 272-1214. The examiner can normally be reached on M-F 8am-5:30pm (alternate Fridays off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Gladys JP Corcoran
Examiner
Art Unit 1733

GJPC